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Vol. 1, No. 12 OCTOBER, 1925 $1.00 PER YEAR

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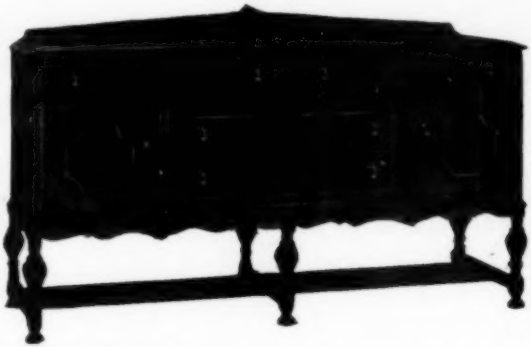

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Industrial Finishing

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With the Editor

CONTACT OF MIND WITH MIND is given credit for nine-tenths of every individual's education today. The other one-tenth a man acquires through the activity of his own fertile mind, it is said. Mental contact comes through personal association and from reading what others have written for the printed page—mostly by the latter.

The principal source of unbiased information relating to practical methods, new suggestions and the latest developments in one's own line of work, is his trade journal or business paper which comes once a month. In the field of industrial finishing this magazine, INDUSTRIAL FINISHING, endeavors to supply such information. Contributors to INDUSTRIAL FINISHING are men whose training and broad experience should command the respect and confidence of all who have anything to do with the selection, purchase or use of industrial finishing materials and finishing equipment.

At times, some of you who perhaps have become specialists in a particular line may disagree with what some contributor has written. However, at the time you read this you know another issue of INDUSTRIAL FINISHING is in the making, and your comment on an article, your interpretation of certain facts, or your answer to some question—this is always welcome—indeed it is solicited. This opportunity for an exchange of ideas, experiences and facts is worth a great deal to men connected in any way with modern finishing activities. This co-operation is productive of more than passing thought; it stimulates a spirit of progress.

Now, about the advertising pages. It is presumed that every thinking reader realizes that without advertising you could have no trade journal, and without a steady increase in such advertising there can be no corresponding growth and development of the trade journal into increasing value in your business.

Advertising pages are a form of service for you, as are also the editorial pages. They acquaint you more specifically with the merits and trade marks of dependable products and equipment offered by concerns of unquestionable integrity—concerns worthy of your confidence and patronage. When advertising pages are of service to you, you will be rendering a return service and much co-operation to both the publisher and the advertiser by simply telling the advertiser, "I saw your ad. in I. F." Thank you.

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Managing Editor.

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Develop Trained Finishers

Special Representative of Peaslee-Gaulbert Co., Inc., having observed the need for more high-class finishers, offers some interesting comments and suggestions on the subject

By J. C. Hertstein, Jr.

WHAT appears to be a serious condition in the furniture industry today, is that, when a manufacturer is in need of a first-class foreman finisher—one who will measure up to the requirements of his proposition,—it is very difficult to find one. It is not difficult to obtain the services of a foreman finisher, but to get the man who can handle the job is not an easy matter.

In the first place, most of the larger plants are taking care to keep the foremen they have. Although some furniture manufacturers do not seem to realize that when they have a first-class man they ought to take care of him in such a manner that he will not leave; you will find that most of them are remunerating their finishers in a satisfactory way, and desire to have them stay.

Probably the real reason for the shortage of extra good finishers is due to the fact that many furniture manufacturers are not looking forward.

On the other hand it is also noticeable that very rarely does a young man, employed in the finishing room, request the foreman finisher to teach him the finishing business from start to finish. This can best be illustrated by a conversation the writer had with a foreman finisher who has been finishing high-grade furniture for nearly 35 years. In spite of the fact that he is nearly 70 years of age this man is one of the most progressive finishers known.

The gentleman stated that during his entire career as finishing room foreman, only two young men have interested themselves to the extent of asking him to teach them all the finer parts of the business.

The younger men should be encouraged in this respect, and the only way to rid the finishing room entirely of this seemingly handicap is to advertise and propagate the fact that the finishing business today calls for men of more than ordinary ability. A first-class finisher must know more than just how to mix stains well. In a large production plant a man must be able to produce, and he must be able to promote unity among the workers, just as well as to know the technical side of all of the various finishing materials.

Although the remuneration is now good in some plants, most manufacturers are looking for better men all the while, and when they get men who can do bigger things and accomplish better results, the remuneration also will increase.

The finishing room holds a bright future for a young man who will put his shoulder to the wheel and allow one of the older men to teach him this business. Then he can go ahead and try to think of new methods or processes, better materials, and in general always be on the outlook for something better.

If this brief article will do no

more than to inspire some of the younger men to take a greater interest in the finishing room and its future possibilities, it will have accomplished the purpose for which the writer intended.

Coating Metal Sheets Rapidly.

When it is necessary to apply coatings of finish or paint to flat sheets of metal, the most rapid and economical method I have found is to run the sheets through the spreader rolls of a machine which operates somewhat like a glue spreader or a washing-machine clothes wringer. The machine for this work consists essentially of three driven rollers mounted one above the other, and with adjoining rollers running in contact with one another. The lower roll is of metal and it runs almost half immersed in the trough containing finishing material of the proper liquid consistency. This lower roller is driven by power. It is only 2-in. in diameter and its function is to carry liquid finish from the trough and spread it evenly on the lower 3-in. rubber roll, which in turn transmits it to the upper rubber roll of the same size. The sheets of metal to be coated are fed between the rubber rollers by the operator.

The metal roller is not adjustable, but the two rubber rollers are mounted on shafts which run in boxes that can be adjusted for height. The pressure of the rubber rollers can be easily adjusted to give a spread of finish or paint of practically any desired thickness. For a very thin coating, the rubber rollers are adjusted to run tightly together so as to squeeze out all but a thin spread of liquid. Thus only a thin coat is transferred to the sheet of metal. For a thicker coating the pressure between the rollers is slackened slightly.

If it is only necessary to finish one side of the sheets of metal, two sheets can be laid together and put through at the same time, thus leaving the insides clean; or the roll pressure may be slackened enough to allow a piece of cardboard being placed on the top side of each single metal sheet to keep one side clean as the material passes through the machine.

Suppose, for example, we are going to coat sheets of black plate with stove enamel, one side only. The operator "breaks" the color down to the correct consistency (which he soon finds out by experience), strains the material, fills the trough and slides same into place beneath the lowest roller of the machine. The machine is started and the correct roll pressure obtained by passing one or more sheets through repeatedly and adjusting the pressure until the right coating appears. When the machine is properly adjusted the operator stands in front and feeds the machine, making sure that no jagged or badly dented sheets go through, as they will damage the surfaces of the rubber rollers. To do good work the surfaces of the spreader rolls must always be smooth and free from indentations or scratches. One or two helpers at the back of the machine take the finished sheets as they leave the rolls and carefully place them on wire racks which are then put into an oven to hasten the drying process.

For a machine of this kind the paint spreader rolls should not

be made of too hard a rubber. Otherwise the rolls will not lay such an even coat. Gelatine rolls can be used but they are more susceptible to damage than rubber rolls. The speed of the machine should be adjusted so that the offbearers will have ample time to rack the finished sheets without marring or damaging the freshly coated surfaces. A machine with rollers 26-in. long will do good work on metal sheets up to 24x36-in. If it is desired to finish larger sheets, a machine must be made of larged dimensions in proportion to the size of sheet to be finished, otherwise the rollers will not carry enough material to cover the whole surface. —A. Tracy, London, England.

The Finish—A Selling Point.

Many furniture manufacturers are inclined to hide their proverbial light under a bushel. Opportunities for gaining profitable publicity are overlooked. In most instances furniture making is regarded solely as a manufacturing problem, and not enough attention is given to the selling end.

Automobile manufacturers and firms in other lines have learned the value of the materials and parts that are used in making their products; these features are talked up to stimulate the buyer's interest. The purchaser is impressed when he is told, for example, that this car has a certain kind of axles and bearings, Harrison radiator, Willard battery, and other parts which the salesman and manufacturer specify. The prospective customer may not know a great deal about axles, bearings, batteries and the like, but the fact that the make is called to his attention inspires confidence, and usually the article which the salesman brings to the buyer's attention is one of genuine merit.

Furniture is not made up of so many manufactured parts as an automobile, and at first thought it seems there is nothing that could be said about the materials used. But what about the finish? To the average purchaser it is the design and finish that represents the furniture to his mind and eye. Finish can be made one of the strongest selling points for furniture.

Let the manufacturer who makes an article that serves a useful purpose and is a good value for the money put his name on it. He positively loses if he does not, for the retailer can switch from one line to another, whereas he might not be so keen to do so if he had built up a nice trade on a line that was known to his customers.

Putting your name on your furniture is another means of sales assistance. It shows that the manufacturer has confidence in the goods he makes and is proud of them to the extent that he wants to put his name on them. Over this same maker's label it would be another talking point for the salesman in the store, if the name of the finish and who made it, also appeared. Letters from the manufacturer to the retailers and their clerks, pointing out the selling assistance that such a label gives and the advantage of talking finish to the consumer by calling attention to the label, would help to put it across for you. Remember that two tags will not be necessary. All the information can be put on the one label you are now using, if you are identifying your furniture in this way at the present time.—G. E. Moran.

Spraying Lacquer on Auto Bodies

Excerpts from the address of Assistant Sales Manager of The De Vilbiss Mfg. Co., delivered at the Fifth Annual Convention of the Automobile Body Builders' Association at Detroit

By E. P. Frey

SPRAYING any kind of a coating is an art, necessitating the spray operator being familiar with the equipment used, understanding the purpose and proper applications of the various coatings, understanding the effects of an increased or decreased air pressure, and to be able to observe defects which appear in prior coatings.

Generally spray-painting is considered easy. It is easy—easy to acquire the correct use of the equipment, just as easy as a haphazard way of manipulation. Various defects, such as pebbling, waves, streaks, runs, etc., can be traced directly to the man behind the gun. It is in his power to make the finish a success.

Air Pressure Important

Air pressures for atomizing the various coatings depend upon the nature of the material, the speed of application and the quality of work desired. This atomizing pressure should be just sufficient to thoroughly atomize the material—that is, if 60-lbs. are sufficient to properly atomize primer or surfacer, do not use 90 or 100-lbs.

Excess atomization pressure merely tends to relieve your mix of some of the volatiles which have been added for a purpose. This excess pressure is responsible for waste of material and defects in finishes.

What has been said about excessive pressures on undercoatings applies to lacquer as well. Air pressures ranging from 45 to 120-lbs. are being used, but surely if the party using 45-lbs. is having success, some addition or subtraction must be made to the mix of the party using 120-lbs.

Systematic Coverage

Covering the surface in a systematic manner, whether primer surfacer or lacquer is being applied, is the best insurance for a satisfactory job. The spray gun should be held six to ten inches from the work, and the hand controlling the gun moved so that it is perpendicular to the surface being coated at all times. This applies where the movement is lengthwise of the body or up and down.

Uniform coating from beginning of stroke to the end is made possible only by this method. Picture the movement of the operator's hand in an arc. He is farther from the surface at the ends of the arc than when in the center. Light ends to his strokes and heavy centers are the result.

Losing the Volatile

Shellac is a mixture of a gum and a volatile. If too high an air pressure is used and the gun is held too far from the surface, the voliatile is all driven out and only the gum reaches the surface. This surface then has an appearance as though sand had been strewn on it. Lacquer is exactly the same.

Thinner is highly volatile, and high air pressure evaporates it so that a good proportion is blown out before the lacquer reaches the work. The farther the spray gun is held from the work the higher the air pressure, the more likely will a rough, pitted job result.

Proper lapping of strokes is essential. Feathering the beginning and end of the stroke by gradually pulling and releasing the trigger of the spray gun makes a lap of uniform thickness possible. Streaking can be eliminated by merely practice in the proper use of equipment.

Latest Equipment

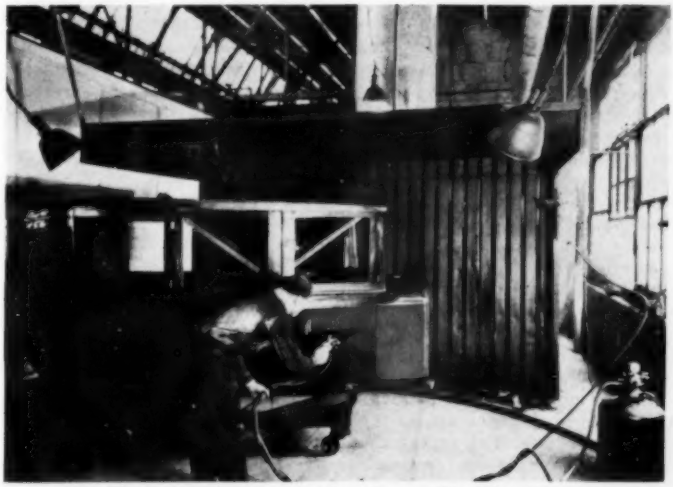
Various types of material feed are being utilized. The recommended method is that of pressure feed; it provides a uniform flow of material, permits the use of lowest possible atomization pressures and makes for greater speed. The containers used in this method are equipped with hand operated mechanical agitators, making possible the use of larger quantities of material and providing means to keep the mix uniform.

Spray guns have been especially designed to handle the lacquer products. Changes in spray guns have been almost as frequent as changes of material. Keep posted on the latest.

Changes in spray-booth construction have also been made to meet special requirements in certain states. The latest construction calls for baffles being installed in the spray booth body and provides a collecting chamber between baffles and back. Fire underwriters look favorably upon this new type of construction.

Touch-up guns of small fluid capacity and very easily handled, have been placed on the market. These can be utilized to advantage on scratches and so forth.

While no attempt has been made to completely cover the



The spray gun lays on material evenly, smoothly and rapidly.

spraying of lacquer, the infractions so general and the things usually neglected have been given. It has been my aim merely to stress on the precautions necessary. Study your conditions, improve them if at all possible and train the operators in the proper use and care of the equipment.

Drying Finishes at High Temperature.

I was much interested in the article by E. W. McMullen (June issue) in which he relates how Simmons' beds are finished. Perhaps my interest was enhanced by the fact that during the war I had charge of the varnish room in a large munition plant, and I did a great deal of experimenting with forced drying of varnish. I have dried in 20 minutes a varnish which would take several days to air-dry.

This experiment was made on steel in a temperature of 350 degs. F. Our usual method was to start with a temperature of 150 degs. F., and gradually raise it to 300 degs. F. This required from three to four hours, owing to the fact that several tons of steel shells were put in the oven at one time. This great amount of steel had to be heated through before the temperature of the oven would begin to rise. As a matter of fact there was always a considerable drop in temperature immediately after the shells entered the oven.

However, what I want to direct attention to is the fact that varnish, dried at a high temperature, is much more durable than varnish dried in the open air, or in a low temperature. The same thing applies to paints and enamels, but, as Mr. McMullen points out, one must be governed in the matter of pigment finishes by the amount of heat the pigments will endure without discoloration or other deterioration.

Automobile manufacturers are beginning to understand the value of forced drying of finishes, not so much from the standpoint of speed as from that of durability. For a long time some manufacturers were baking the finish on the fenders and hoods of their cars, and air-drying the finish on the bodies, or at most, drying the latter in a very moderate temperature. After a season of exposure to all kinds of weather the finish on the bodies had lost its life, while that on the fenders and hoods was as good as the day it left the shop.

The difference in durability was due largely to the difference in drying. Experiments have shown that varnishes dried in a high temperature are more moisture-resisting than they are when dried in a low, or even in a moderate temperature.

In finishing automobile bodies that are constructed of both wood and steel, one must be governed by the limitations of wood to withstand heat. The same applies to the drying of varnish and enamel on wooden furniture. There was a time when finishers thought a temperature of 120 degs. F. was about as high as varnish would stand.

We know now that a good varnish will stand a higher temperature than wood. When animal glue was used we had to be considerate of its limitations to stand up under a high temperature. Now we have a glue that will stand as much baking as any wood.

In drying finish on wood at a

high temperature, we must not overlook the fact that humidity plays an important part. To subject wood to a high temperature that is almost totally devoid of moisture, even for a couple hours, would set up such strains that the wood might be seriously injured. When joints give way under a high temperature, it is not the heat that causes the damage so much as the lack of moisture in the air. With the proper humidity in the drying room the finish on furniture can be dried at as high a temperature as the glue in the joints will stand. We now know that a temperature of 140 degs. F. is high enough for animal glue when in the liquid form and protected by water, but when the glue is dry and without protection, it will not withstand nearly so high a temperature.

For this reason it is not safe to use a temperature higher than 120 degs. F. for drying the finish on furniture that has been glued with animal glue. But even this temperature saves a great deal of time over drying in the old way, and it gives a far more durable finish.—T. A. Wildum.

Treating Veneer.

To polish veneered work, scrape surface smooth and clear it of dust. Apply a coat of size, to seal the grain, after which apply the stain. When dry the surface may be polished. Don't use too much oil in the work; the polishing is in the usual way.—K. D. R.

Graining Out.

What is called "graining out", is simply the result of the wood not being dry when its surface is finished, either by the planer and sander or by the wood finisher. Some of the grain of the wood shrinks away, leaving the rest of the surface to stand as if raised above the general surface. For instance, after a built-up panel has been glued and is then put through the sander before it is dry, graining-out will occur.—T. E. H.

For Moving Heavy Barrels.

A new and effective device especially adapted to moving heavy barrels and drums of oils and finishes has been brought out by the Marion Tool Works, Inc., Marion, Ind. It is a six-wheel dolly truck of all iron and steel construction, built very low and with a trough-like bed to receive the curvature of commercial-size barrels and drums. It has two iron skid projections on each side so a barrel can be rolled onto or off it easily from either side. The

The outstanding features of this barrel or drum dolly are its low trough-like bed, the skid projections at sides, the middle wheels of larger diameter and the roller bearings.

construction is such that the dolly truck does not move while being loaded or unloaded. The low, broad wheels run on roller bearings, and the center wheels are slightly larger in diameter to permit of tilting either end of the truck so as to move it and guide it more easily. Dolly trucks of this type are made in two sizes, 24 and 32-in. in length.

Finishing Costs—Other Costs

Industrial Engineer points out that in well organized and well managed factories, finishing room labor and material costs bear a definite relationship with other departmental production costs

By Chas. F. Scribner

PRIMARILY the purpose of every business is service—at a profit. Many concerns have good buildings, excellent equipment, and a competent sales organization, but have no methods by which they can measure current operations in terms of profits secured.

The argument is sometimes advanced in furniture manufacturing that competition sets the selling price, so there is no need for cost finding methods. Those who advance this argument, or who hold to this belief, must not forget that when their selling prices are less than the cost of production a time soon comes when they wish they had facts upon which they could have depended in the past.

Finishing Costs Important

Producing goods which are processed through the finishing room, such as furniture, cabinets, chairs, and similar products, the cost of work in the finishing department has an important bearing upon the final results secured. This importance comes from two sources:

(a) The cost of the labor employed in the department and the effectiveness of its use.

(b) The cost of materials re-

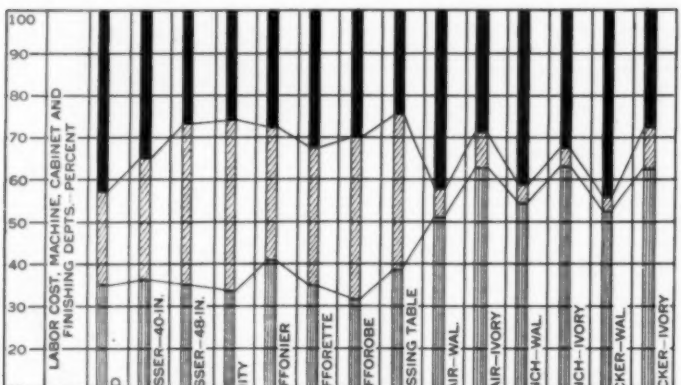


Fig. 1—Chart showing comparative labor costs for finishing, cabinet work and machine work on various pieces of furniture.

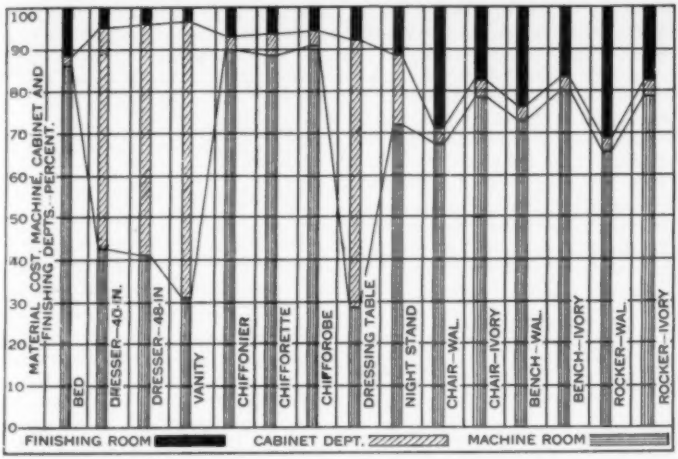


Fig. 2—Chart showing comparative costs of materials for finishing, cabinet work and machine work on various pieces of furniture

quired for the finishing process and the amount of output which can be secured from a given quantity of material.

Very few managers have made a critical study of the relation of finishing room costs to other production costs of their business. In a majority of cases much time and attention is given to the work in the machine room, but the cabinet department and finishing room are left to take care of themselves, it being assumed that little chance exists in these departments for betterment, as compared with the machine room.

An analysis of the comparative departmental costs of the three principal departments in a number of furniture and chair plants, with the resulting figures plotted to show the percentage of cost that is incurred in each department, furnishes information of considerable value to the executive who is seeking ways and means for greater profit. Such an analysis as applied to labor costs of bedroom furniture is shown in Fig. 1, for the various items produced.

Interesting Figures

From a careful study of this diagram it is seen that in the production of case goods the finishing room labor cost represents about 30 percent of the total. In the case of chairs this percentage increases to about 40 percent in the walnut and mahogany finishes—which comprise the largest volume—and is about 30 percent in the case of goods finished in ivory and enamel.

Experience proves that the value of any cost methods is no greater than the attention given to their findings. Conditions in the finishing room, as indicated by the foregoing diagram, show that labor cost in this department is only slightly less than in the machine department and, conse-

quently, merits an equal amount of attention on the part of supervising executives.

As the finishing process comprises almost entirely a series of manual operations, it offers an exceptional opportunity for effective employee training and increase in labor efficiency. Such opportunity exists in a lesser degree in the machine department, because the speed and feed of many machines regulates, to a large extent, the volume of output produced.

Material Costs

A similar analysis of material costs in these same three major departments is shown in Fig. 2. In the production of case goods two facts will be noted: (a) where mirrors are not used the material cost represents over 80 percent in machine room, due to initial material requirements; (b) where mirrors are required they represent about 60 percent of the total material cost. In the case of chairs, the initial material represents about 75 percent of the total material costs, with a small material cost in cabinet or assembly department and the balance incurred in the finishing department.

These diagrams show a way in which the comparison of labor and material costs in various departments has been profitably set up as the basis for future action toward their profitable reduction. They will suggest to readers a method by which their own costs can be shown in a manner leading to more profitable operation.

Laying Decalcomania Transfers.

Decalcomania decorations are returning to favor, and promise to become very popular for the better grades of furniture. Great improvement has been made in these transfers, and it is now possible to obtain them so perfectly made that they are equal to the finest paintings. There seems to be no limit to the designs. Reproductions of masterpieces from the brushes of the world's greatest artists in figures and landscapes, marquetry designs and pearl inlay, are all created here with equal perfection.

Some furniture manufacturers have special designs made for their own exclusive use. These designs are created by the furniture designer, or in the studio of the decalcomania manufacturer who employs expert artists whose services are always available for such work.

A man of ordinary intelligence can lay these transfers successfully, though it requires some little practice to do so with the larger ones. The method of procedure is to apply a thin coat of adhesive to the transfer side of the paper. Some decalcomania manufacturers supply this glue. I have always made my own adhesive by thinning down a little varnish with pure turpentine.

The liquid glue is applied evenly with a very fine brush of suitable size. A small pencil brush, of camel's hair, is used for the smaller transfers, while brushes ranging up to a 1-inch brush are used for the larger ones. The adhesive must not be too thin; it is very important that it be applied evenly.

Before the transfer is laid the cement must be allowed to become tacky—but not too nearly set. Here is where some experience is needed. One must know when the adhesive is just right for holding best.

When the adhesive is just right, lay the transfer with the cement side to the place where it is to remain, being careful to get it on straight. Work out any blisters by pressing them down with the hand; then go over the whole surface with a soft rubber roller.

Blisters are caused by air being entrapped below the transfer. A good way to avoid blisters is to hold the transfer, one end in each hand, and press the right-hand end down first. Then take the roller in the right hand and follow up the transfer toward the left hand, letting the transfer down as the roller advances. If the transfer is too large for the roller to reach clear across, run the roller up the center first, then from the center to the sides. If one has different size transfers it would be well to have rollers of different widths.

It is of the greatest importance to remove all traces of blisters and have the transfer lay perfectly flat and tight; if it is loose at any point, the transfer will break away and leave a vacant place.

To remove the paper which backs the transfer, saturate it well with a sponge and water, going over the whole surface as quickly as possible. This causes the paper to swell almost immediately, and it is well to have this swelling take place over the whole surface at the one time, to avoid danger of the transfer cracking. The water should be applied freely; when the paper is loose enough to be removed it will move at the slightest touch, or rise from the action of the water. If the paper appears to stick at any point, do not force it away, but give more time to soak.

Carefully guard the paper side of the transfer from oil, varnish and all similar things, for wherever these are present the water will not penetrate. As a result the paper will stick and the design will probably be broken.

In selecting transfers one should be careful to pick out those that harmonize in color with the color of the wood background on which they are to be applied. Contrasts are all right provided they are not striking; mild contrasts are preferable.—K. L. J.

Paint Driers.

Driers, as used and manufactured by up-to-date firms, are entirely different from the old-fashioned driers based mostly on compositions of sugar of lead, litharge, oxides of manganese, etc. Today improved products in driers are offered based on linoleates, aluminates, palmitates, stearates, and cobalts, the last one being the strongest of all. Whereas, the first-mentioned driers showed deterious effects on oils and also changed certain coloring matters, our present day driers are more neutral in all respects.

In many factories today the rubbing of varnished or other finished surfaces is supplanted by ready-made flat varnishes, flat paints, lacquers, etc.

Grinding of colors and basic paints is now done by improved machinery. Colors in oil and japan are ground in burr and Esopus stone, roller, steel-plate, bronze-plate mills and some newer devices. Liquid paints, enamels, etc., are ground in rotating pebble or steel-ball mills or drums.

Confusing Names Explained

Consulting Engineer on finishing problems explains wherein enameling, japanning and lacquering have different characteristics; processes and materials now used are not those used when names were first given

By W. J. Miskella, M. E.

ENAMELING, japanning, lacquering, shellacing—these are all terms that are frightfully misunderstood. The misunderstanding dates back many years—almost to the time when Korea was a part of China. Many years ago the art of japanning was a fad, fashionable ladies worked at it much the same as we do crossword puzzles today.

It has not been explained why the term "japanning" was used to designate the art unless the Japanese were responsible for it after Korea was taken from China. Anyway, the Chinese deserve the honor of having originated the idea, whatever it was called.

Old and New Japans

Japanning of that day and japanning of today are radically different and the author will try to explain the development from the start. Originally there was a material called oriental lacquer. This was made from the lac tree which grew in both China and Japan.

The cheap labor available at that time made it practical to apply as many as forty coats to a single piece of work and stranger still, it was not uncommon to have the application of these forty coats take as much as six months time.

At first the work was dried in the sun, but later a humidity box was provided, which scientifically had the effect of oxidizing the finish much the same as the modern drying ovens produce the varnish finishes of today. In other words, the oil from the lac tree was very similar to our linseed oil.

These black varnishes during the eighteenth century were called Japanese varnishes. Later the name was shortened to Japan varnish; still later, in modern times, the noun varnish was dropped and the adjective "japan" became a noun by common use. Thus, we have an explanation of the derivation of a term that has been used almost universally by the paint trade.

It should be recognized that the japan material as used today is not at all like the japan material that was used in the early days. When the process was taken from Japan and China to Europe it was the custom to apply four or five coats of the material in a dry bake oven, each coat being baked for several hours.

When the production demands of the automobile industry became great enough improvements in baking ovens were forced with the result that the time of baking an oven-load was reduced from a four-hour period to one of forty-five minutes. Thus the baking japan of today, applied in one, two and rarely over three coats has taken its place in the history of finishing as one of the best and most satisfactory finishes that the world has ever known.

The Modern Japanned Surface

It is interesting to note that this japanning material which has the property of making a uniform solution, when cooked with linseed oil and a few other things, finally arrives on the surface of the finished article in almost the same state as the gilsonite was when it was in the mine; in other words, the process of japanning is really one of transferring the mineral from the mine to the article to be treated.

This further explains the durability of japan. It deteriorates only when the surface to which it is attached, is affected in some way, such as by rusting, for example. Truly, it is almost a pure mineral what remains of the japan after it has been baked on.

Enameling

In the japanning trade, it is customary to find a close association between the terms, japanning and enameling. The former covers the application of baking blacks on metals while the latter covers the application of baking colors on metals. In fact, the original designation for the colored finishes was, japan-enameling.

The prefix, japan, was dropped and thus, we have the bare term, "enameling," applied to baking colors. The misunderstanding of the latter term is further complicated by widely advertising enameled finishes on automobile parts. In a way, there was some ground for this action, because there was available a truly named black enamel made from a black resin and this material was used on high grade jobs. Anyway, the proper name for the material that is being used on most fenders today is japan.

Japan Drier

Another item that is used in the paint trade is japan drier. This material has no use whatever in baking japan, being used only to hasten the drying of an air-dry coating. The common practice of using the shorter name, driers, by dropping the descriptive prefix will assist materially in clarifying these various terms.

Shellac

Shellac has contributed its share to the mix up. It is a common mistake to think of shellac as coming from the lac tree; while, as a matter of fact, it is produced from the excretion and dead bodies of a certain insect deposited on the outside of the tree. Being a material which dries by evaporation it is somewhat like modern lacquer—another term that adds fuel to the fire.

Lacquer Enamel

We have heard of lacquer enamels and since they were marketed only a few years ago, it is not hard to explain that the lacquer manufacturers were trying to produce an article that would compete with colored japan-enamels, and so lacquer enamels and colored enamels mean the same so far as a color classification is concerned. However, the author sees no way of preventing confusion in the future unless the descriptive adjective be used to explain which kind of enamel is meant.

Another kind of enamel—glass or porcelain enamel, used in the ceramic industry should not be overlooked, for it, too, adds its share to the mixture of terms.

Nitrocellulose Materials

Last, but not least, there is modern lacquer or pyroxlyin lac-

quer or nitrocellulose lacquer as this material is also called. And, what a revelation, when one starts to dig into history to find out something about it!

Worden tells us most of the things about the history of modern lacquer that we would like to know. In his book on Cellulose Esters he makes the marvelous disclosure that over 27,000 patents have been issued, principally in England, France and the U. S., covering this classification! Think of it!—and we are only beginning to hear about it.

Nitrocellulose appears to have made its showing as a coating material in a patent taken out in England in 1855. The first American patent seems to have been taken out in 1882! It is unfortunate that the term lacquer was not changed to something else shortly after the late war when the turning point in its success came.

The war was on. The British were making cordite—quantities of it. They had to have acetone. The principal outlet for acetone at that time was in the comparatively small production of nitrocellulose lacquers. There wasn't enough acetone in the world to supply the British needs.

Finally, a series of patents taken out by Charles Weizmann were uncovered. These patents described a bacteriological process for making acetone out of corn and other starch materials. The waste in the process was butyl alcohol. There was no known market for it and it took chemical engineers nearly five years to discover that it could be used to make butyl acetate which in turn could be used in modern lacquers.

About the same time, improvements were made in lacquer manufacturing plants to permit the addition of more body. Thus, almost over night modern lacquers took their place in the list of the world's most satisfactory finishing materials.

They are classed as materials which dry by evaporation and are, therefore, stable like baking japan. Time only will tell how long they will remain stable, but what history there is to go by so far indicates that they'll have a mighty fine future.—Paint, Oil and Chemical Review.

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Paint Thinners.

Volatile thinners or reducers for paints as presently employed are of a different nature than years ago. Pure spirits of turpentine was practically the only medium for that purpose. Now we have petroleum spirits, benzine, asphaltum and coal tar distillations known as benzoles, liquid carbons, etc. Turpentine, owing to its uncertainty in natural production and insufficient supply, has given way to above mentioned discoveries. As a matter of fact, the quantities of turpentine at present used in the paint industries are only a minor percentage against the use of other reducers or solvents.

Tungsten (or wood), Perrilla, soya bean, fish and other oils are now used to replace linseed, or to improve or cheapen same, as the case may be.

Piano Finishing—II

In this the concluding installment of a two-part article, the author explains the process of piano finishing from the completion of staining on through the final finishing of a high-grade piano

By Leonard S. Decker

BEFORE FILLING, sand the stain coat lightly with fine sandpaper or cane shavings. Then dust off well. Filling is where most of us try to hurry too much; we should not, for it is the base of the entire job. Now to prove it to you: Suppose you fill your work in a haphazard manner and then look at it through a magnifying glass. What do you see? The pores of the wood are not filled. So you had better inspect your work with the glass and fill up where needed. We all know that a good filling job is as good as a coat of varnish.

Filling Mahogany

To fill mahogany, mix your filler about like cream. First pour in a little turps, break up the filler good, then add the rest of the turps until it is the right consistency. Oak is filled in just the same way except that the filler may be cut with gasoline. The filler should be applied on surface as evenly as possible.

Do not coat too large a surface at a time, but wait until the filler sets. Then, with a handful of tow or fine excelsior, go across the grain, rubbing it in well. Then clean off. Now take clean rags and polish the work. That gets off all superfluous filler so it will not look smutty.

I sometimes use the flat of my hand to rub in the filler. If filler works too hard, put in a little linseed oil; if it dries too slowly add a little drier. Years ago I made all of my fillers and stains, but now it doesn't pay, because the stock you buy today is the same uniform stain. Buy your stains and fillers from a live-wire concern for they stand back of their products.

After the filler is rubbed in, polish with a clean cloth. Now take a stick, point it at one end and make flat on the other end; with this stick, clean out all corners and cracks. If accumulations of filler are left in corners or crevices, they will turn white under the varnish. Do not use a brush for cleaning off surplus filler, as this takes it out of the pores.

First Coating

Sand your work well. Get it as smooth as you can without cutting through. Always have stain near so you can touch up any cut edges. Dust off well with a fine hair brush.

Now take a quart of rubbing varnish and cut with a pint or half-pint of turps, according to varnish used, and coat. Leave a streak about two inches wide through the center of any large surface, then cross grain. Now some may wonder why I leave a streak. Well, varnish heaps or crawls toward the center and this remedies it. This is for hand work, not spray.

If your varnish is too cold, set your bucket in a pail of warm water and it will soon warm.

Never set it on a stove or hot steam pipe. Let your work stand until dry; do not hurry it, nor let it stand too long. Sand this coat, dust and chamois off. To a pot of varnish, right from the can, coat as before up and down, across grain and lay off. This is coat number two.

Now the rest of the coating is done in the same way, four, five or six coats, whatever body may be. You can sand between coats or wait until you have bodied-up and then rub with coarse pumice stone.

Coarse Rubbing

After the surface has been bodied up, take some blocks 2 or 3-in. thick by 3 or 4-in. wide, and glue or cement felt around each end of block so you can get a good hold of it. Make different sizes for different places. Where you want to rub, sprinkle the surface with pumice stone and water; be sure to put on enough to last. Never put on fresh stone after starting, unless you are sure it will not cut through. Take long strokes; it is easier and better. Now, wash and chamois off dry.

Flowing or Finishing Coat

Now look over your work well and see that it is washed clean. Take it in the flowing room and give it a heavy coat of polishing varnish. Have it good and warm. Of course this depends on the varnish. Do not cross the grain this time, but lay up and down. Do not brush any more than necessary, and leave no streak in the center this time.

Fine Rubbing

After work is dry, take fine pumice stone and rub as before, only look out for scouring and scratching. Rub just enough to get a surface that is uniform.

Polishing

Care must be taken here. Put felt on blocks as before. Dip in water and then in brick or very fine rotten-stone and polish work until scratches and hair lines are gone. Now take what stone is on the work, wet your hand and go the full length with hand just as if you had the block. Then wipe hand on chamois skin. Do this until you get your polish up bright. Clean all stone off case. Now you can put on transfer or put it on and flow over it.

Oiling Off

Pour some lemon oil on a piece of soft leather and rub your hand first across the leather and then on the case until it is quite smeary. Now take a little brush and get the creases wherever there is any stone.

Alcohol

Next wash and dry a piece of cheese cloth. Take a small piece and fold it so it is flat, then sprinkle on a few drops of wood alcohol. Wring it out well and place it on your hand. Put your thumb and little finger on the cloth, and the rest of your fingers under it. Now test it to the side face. If too cold, let it get weaker, then with a circular motion go over the case, taking care not to burn the finish. It is now ready for the packer.

Care of Spray-Booth Fans.

One of the things that troubles some spray operators is the way the suction fan becomes coated with varnish or with whatever materials are used for spraying. Many spray-booth suction fans are operated electrically by small motors and a belt. When the fan becomes heavily coated with material it not only puts more work

on the motor but it becomes less efficient as a suction agent. As the fan gradually becomes coated with material its efficiency is equally diminished. This may be done so slowly that the operator is unaware of anything unusual taking place. However, after a time he finds the fumes are bothering him more than usual, or at least more than they did at the start.

Fan blades should be cleaned regularly.

The fan should be so installed that it can be easily taken down for cleaning purposes. This also applies to the discharge pipes leading to the outside. I have known the pipes to become so clogged that the fan was almost powerless to remove the fumes and vapors. No matter how powerful the fan or the motor, they cannot do the impossible—they cannot make a 2-in. outlet do the work of a 10-in. outlet. Especially is it important to watch for clogging if the pipes have an elbow, or bend, because a bend usually clogs up more rapidly.

The easiest and best way to clean the fan and pipes is to dip, or soak them in a caustic soda solution. The strength of the solution required depends on the amount of material to be removed, and the length of time being allowed for its action on the metal. Ordinarily a solution, consisting of one-half pound of caustic soda to each gallon of water will clean everything off to perfection over night. Rinse the surfaces with clear hot water. If the surfaces are very badly coated, it may be necessary to use a stiff brush on the inside of the pipes to assist in removing the dissolved varnish. The original caustic soda solution may be used a second time by adding a little more soda, and possibly a little more water.

Fans are usually painted before they leave the factory, to protect them from rust, and to improve their appearance. This paint will all come off when the caustic soda solution is applied, and possibly expose the outside casing to such atmospheric conditions as cause rust. There are several ways by which this difficulty may be overcome. One is to give the outside of the fan a coat of shellac. I suggest shellac because it dries quickly, and the quantity required is not very great. Another way is to coat the surface with some heavy machine oil. When new, the outsides of the pipes show a tinned surface, but the caustic soda will eat away the tin in time. When this occurs the surfaces may be treated with oil the same as the fan.

After cleaning the fan be sure and oil the bearings before it is again put in use. The majority of motors have self-oiling cups, and it is better if the fans are likewise equipped. In any event give the bearings a good oiling before starting.—W. C. Byers.

Lacquering Broom Handles

Explaining what materials, colors, methods and apparatus are employed by some manufacturers of broom handles. Many improvements have been adopted

By W. H. Martindale

IN years gone by it was almost the universal custom to finish broom handles with one or more coats of clear shellac or shellac substitute. A little later colored broom handles became popular and the shellac or shellac substitute was tinted with spirit soluble colors, which gave a transparent colored finish.

Today, practically all colored broom handles are finished with colored lacquer enamels, made by incorporating pigments in clear lacquer. These lacquer enamels are solid covering, hiding any small defects in the wood and giving a uniform, quick-drying, hard, wear-resisting finish.

Various methods of applying broom handle lacquers, whether clear or colored, are used, but most of them are applied by dipping. Some manufacturers merely dip the handles in the lacquer and hang them up to dry for a few hours. After that the handles may be packed for shipment, or recoated, according to the quality of finish desired. This method, however, does not give a uniform thickness of coating and is somewhat wasteful of the lacquer.

Squeegee Method of Dipping

The most common method of dipping is the so-called rubber gasket or squeegee method, by which the handles, after being dipped, are pulled through a rubber disc which uniformly distributes the lacquer, wiping off the excess and returning it to the dip tanks.

Although there are many arrangements of the rubber gasket and dip tank, one that is easy to construct and that gives good results is shown in the accompanying sketch.

Squeegee Dipping Apparatus

This apparatus consists of a long, narrow, vertical, dipping tank constructed from a piece of iron pipe about 2-in. in diameter and long enough to accommodate the handles to be dipped. The bottom end is closed by means of a cap. Near the top the vertical dip tank is connected with a constant level tank, usually of not more than one gallon capacity. This tank should be fitted with a cover to lessen the evaporation of solvents from the lacquer.

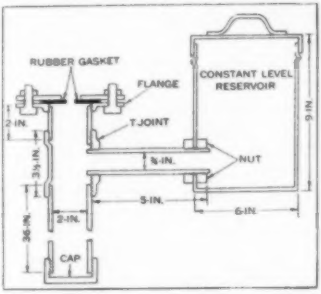
Clamped over the top of the dip tank is a rubber washer or gasket with a round opening in it, somewhat smaller than the diameter of the handles to be dipped. Various degrees of hardness are used in this rubber washer, according to the thickness of coating desired on the handles.

The amount of coating left on the handle at each application can also be regulated to some extent by the thickness or viscosity of the lacquer, and by the relative size of the opening in the washer as compared to the diameter of the handles. A little experimentation will quickly show what degree of hardness of rubber, what viscosity of lacquer,

and what size opening are required for the best results on a given type of handles.

How Coatings Are Applied

The coatings are applied by injecting the handle through the opening in the rubber washer down into the vertical dip tank. The added volume of the handle forces the excess lacquer through the connecting pipe into the constant level tank. The handle is then withdrawn with a fairly rapid, uniform motion which spreads the lacquer uniformly in a thin coat on the handle, returning the excess to the dip tank. Care must be taken to pull out the handle vertically so the pressure of the gasket will be uniform on all sides of the handle.



Cross-sectional view of simple dip tank and lacquer reservoir.

As the handle is pulled out, the lacquer again flows from the constant level tank into the dip tank until the same level is established in both tanks. Fresh material should be added to the constant-level tank only when there is no handle in the dip tank. The level of material in the tanks should never be higher than that of the rubber gasket; otherwise the lacquer would flow out through the hole in the gasket.

The number of coats used varies according to the type of finish, but usually from one to three coats of lacquer are applied at intervals of one hour or so, depending upon the luster and thickness of coating desired. Some colors require more coats than others, because of the difference in hiding power in the various pigments. Where an extra high luster is desired, a coat of clear lacquer is usually applied over the coats of colored lacquer. Clear lacquer is used directly over the bare wood when the handles are finished "natural".

As a rule, the lacquers are applied without any reduction, because they must be heavy in body or viscosity to give good results by this method. Lacquer reducer is added at intervals to replace the small amount lost by evaporation; this prevents the lacquer from becoming too heavy through continued use.

Colors and Materials

The colors most frequently used are yellow, blue, purple, red, orange, black, white and clear. There are many qualities of broom-handle lacquers on the market, ranging from material that is really nothing but shellac substitute with only a little dye or pigment incorporated in it, up to good quality lacquers containing sufficient high-grade pigment to cover solidly in one coat.

It pays to use materials of the best quality, even though the original cost may be a little higher, for they usually coat more handles per gallon, put on a heavier film, and give a finish that will stand all the wear and tear to which a broom handle is subjected.

Gold, Silver and Aluminum Paints.

There are a great many formulas for gold paint as a substitute for gold leaf, and each manufacturer has his own secret formula. The manufacture of gold powders, or bronze powders as they are generally called, is pretty well perfected at the present time. It is toward the production of a medium for applying these powders that attention is being directed now. Along with many others, the writer has done some experimenting and believes he has obtained a splendid medium for applying these powders.

Dissolve 1½ lbs. of bone-dry bleach shellac in one gallon of grain alcohol, using a glass vessel for the purpose. Stir until thoroughly dissolved. Allow it to stand until the solution shows a clear liquid at the top, and a sediment at the bottom. Pour off this clear liquid and use it for mixing the powder. The liquid should be almost colorless, and quite transparent.

One good feature of this liquid is that it dries quickly; one disadvantage is that it will not flow out like varnish. It must be applied quickly and with as little brushing as possible, to avoid brush marks and laps, but with experience this can be done.

One of the principal requirements in a bronzing liquid is that it will not interfere with the gold effect of the powder. I think this object has been attained in the liquid here suggested.

To make what is known as "washable gold paints" one must proceed as follows: Take one ounce of finely-shredded, transparent celluloid and saturate it with acetone; then add sufficient amyl acetate to make 1½ pints. This makes a celluloid varnish. To any quantity of this varnish add sufficient gold bronze powder to make paint of the desired consistency.

Washable silver and aluminum paints are prepared in the same way, except that bronze powders of these metals are used in place of the gold bronze. For bronzing, which is not to be coated over with varnish or lacquer, the celluloid varnish has no equal as a medium, because it encloses the bronze flakes in a coating which is not affected by air or water.

Where a real glistening gold effect is desired, the best method is to apply the varnish to the surface and, after it has had time to flow out smoothly, apply the bronze powder with a bellows. Of course, the powder must be applied before the varnish has become dust-proof.

To make a real smooth bronze finish, apply a considerable surplus of powder, and with a velvet pad rub the powder well into the varnish, rubbing lightly and with a circular motion, always having sufficient loose powder beneath the pad to prevent any possibility of the pad sticking to the surface. This method produces a finish nearer to the real gold leaf than does any of the imitations of which I have any knowledge.

Imitation gold leafing can be done as directed in the preceding paragraph, only on a surface that has been specially prepared. The usual method of preparing the surface is to apply two coats of shellac and then sandpaper perfectly smooth. This is necessary to seal the pores of the wood to prevent complete absorption of the bronzing liquid.

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aluminum paint can be made by mixing aluminum powder with what is known commercially as "banana oil." Many of the ready-mixed aluminum paints are prepared in this way. When buying these it would be well to state whether they are intended for outside or inside use.—Wm. B. Jenner.

Removing Fuzz From Birch After Staining.

Every finisher of experience knows that water stain produces a clearer and more lasting color than does an oil stain. The advantage of an oil stain is that it does not raise the grain of the wood. The grain, or fuzz, of the wood can be removed by sandpapering, but the effect of sandpapering is frequently a faded appearance, often necessitating a second coat of stain.

I have done a good deal of experimenting with water stains on birch, as well as on walnut and mahogany, and have found that rubbing the wood with fine excelsior after the stain has become thoroughly dry is almost, if not quite, as good as sandpapering. The rubbing should be done with the grain of the wood. The effect of the excelsior is similar to that of steel wool on varnish, and removes only the loose fibers without cutting into the stain. Another great advantage of excelsior over sandpaper for this work is that it can be much more quickly done.—M. L. K.

Lacquer Fillers Improved.

Since the writing of article on Nitro-Cellulose Lacquers in the "Marietta Message" and which you have used in the August issue of INDUSTRIAL FINISHING, under the heading "Fillers For Use Under Lacquers," there has been a considerable advance and improvement in these products, and for this reason we believe it timely to offset the remarks in our previous article, by the use of the following information on the subject:

We have unlearned and learned a lot about fillers for lacquer work during the past few months. Among other things we have solved the problem of the graying of the filler. Also we have found that certain fillers showed a tendency to encourage peeling or stripping of the lacquer film from the wood, while fillers of another type consistently showed perfect bonding of the filler and the lacquer.

We have frankly been surprised at some of the conclusions plainly indicated by the results of our research work. We have found, for instance, that the increased use of processed raw material improves the bonding qualities of the filler.

As the result of all of our work we have developed a new type of paste wood filler which is handled in the usual manner and requires 24 to 48 hours drying under normal air-drying conditions. The lacquer film knits perfectly to the filler and there is not the slightest graying in the pores or muddying of the film. —Marietta Paint & Color Co.

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Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

OCTOBER, 1925

Old Materials and Methods Go.

In a paper read at the recent Convention of Master House Painters and Decorators Ass'n. of N. Y., Geo. Whigelt declared that:

"The Swan Song of many materials and methods to which our older brethren were accustomed is now being intonated, and new ideas, methods and materials are born. Many of us are reluctant to adopt new methods as the old ones seem so good to us but the sooner we will discard the old ideas the better off we will be. None of us want to be accused of retarding progress but many of us do it unconsciously or for the lack of effort to tear ourselves away from the more convenient style we have been used to."

A Goal in Lacquer Development.

Speaking of "The Progress of Lacquer Work", before a group of automobile body builders, L. C. Hill of Valentine & Co., declared that:

"One of the first ideals that we are all going to strive for, of course—I won't say that it is even within seeing distance at the present time—is the spraying of the clear lacquer for a final coat on an automobile that flows out and lays like varnish with the same depth, the same lustre.

"That is the idea for which all paint chemists are striving in the nitro-cellulose field. It is just as foolish to say that it is impossible as it was for the prominent mathematician at Yale University who figured out very clearly that an airplane that was heavier than air could not fly."

Finisher Fire Hazards.

All practical finishers and painters have recognized for years the fire hazard involved in the storage, handling and use of paint and varnish oils and thinners. They know the danger of spontaneous combustion is always present where wiping rags, waste, etc., are used in connection with these materials. The slow oxidizing action of oils, when confined in the folds of rags or wiping waste, creates the principal danger. The tighter rags are rolled the quicker they take fire. Temperature rises to the point of ignition and the material bursts into flames.

An explosive hazard is also created by the presence of inflammable vapors issuing from open containers of benzine and gasoline; this is especially dangerous in closed rooms. As for japan, insurance companies class it almost next to gunpowder, from a risk standpoint.

Lacquers and lacquer solvents also constitute a fire hazard, and proper precautions must be taken wherever they are used—if reasonable safety counts for anything. After the volatile or solvent parts of lacquer disappears or evaporates, the powdered waste that falls to the floor and

collects all over the spray apparatus, is dangerous and explosive. This waste material should be removed regularly.

Some of the latest insurance regulations include recommendations for a special all-metal cabinet for storing lacquer materials that are not in actual use.

Special attention must be given to the exhaust system for removing fumes and waste materials of the spray. In this connection it is well to remember that an unprotected fan motor, or an electric switch that may spark, or a light globe that is likely to be struck and burst—these are highly dangerous in the modern finishing room and paint shop.

Every room in which finishing or painting is done should have one or two dependable fire extinguishers, and two or more covered buckets filled with fine sand; these should be marked distinctively and located in accessible places where they are always ready for instant use. Never throw water on a fire in a finishing or painting room; water only spreads the flames. Smother the fire with sand, and do it quickly.

Remember this above all else: always use good judgment, be careful, and keep the finishing room clean, as this in itself will go a long way toward preventing a fire.

Visit the Other Fellow.

How can a foreman finisher supplement existing knowledge? Well, there are trade-papers as one means. Text-books and meetings of various kinds help. And what do meetings suggest? Here alone consider the possibilities of the periodical visits to other plants, particularly such factories as perform the same kind of work.

How many finishing room foremen consult brother executives and finishers in neighboring factories? Some there are who with profit might even take a trip to other cities to see how similar work is done in different plants.

Yet the opportunities are illimitable so far as your own city is concerned. There are other foremen confronted with like finishing troubles. How they would like to discuss with you, problems—your problems, their problems! Resultant discussion and solutions through frequent visits would prove of mutual benefit.

Occasional visits to other plants may represent an adventure every time; then again, contingencies may arise suggesting a hurried consultation with another in the business, perhaps only a few blocks away. Some day you can reciprocate.

When the other man has a perplexing finishing problem before him, you, by reason of your peculiar and particular experience, can help him out of trouble. There is nothing to lose, but there is a world of knowledge to gain by means of these time-to-time explorations.

A decorator can change the apparent size or shape of a room through the use of color. He can make the room appear larger by using a receding color, such as light blue, or smaller with a warm color, such as red or brown. He can also emphasize the length or height of a room by the use of differently-shaped panels and by different color distribution.

What the painter knows as "tooth" is a very necessary condition in all metal painting.

Period Finishes—Sheraton

Revealing how Sheraton styles originated in England, and describing the characteristic ornamentation, along with recommended finishes for showing true Sheraton to best advantage

By R. J. Meade

THOMAS SHERATON was the last of the distinguished furniture designers flourishing during the Georgian Period. A poor provincial cabinetmaker, he repaired in 1780 to London, hoping like many of his kind to find there the prosperity he could never hope to attain at home. It was not long before he realized that, unless he could improve his meager education, hope of advancement was futile. He accordingly applied himself seriously to the study of drawing and designing.

Inspired by the classic simplicity of Louis XVI and with contempt for the ornateness of his competitors' styles, he published in 1791 his immortal "Cabinet Maker's and Upholsterer's Drawing Book." In it he proclaimed his championship of the straight line and, although at first his work was derided as too frail, it developed that he was an extremely close student of construction. In fact many of his most delicate originals are today in good condition, where more massive pieces of the same period have required frequent repairs.

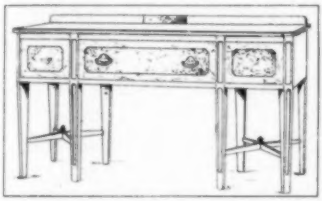
In his day Sheraton was also looked upon as an inventor. He originated twin beds, built the first roll-top desk, and contrived all manner of ingenious folding furniture—the forerunners of our modern davenport beds. He also designed complete interiors for some of the finest residences in London. But with all of this, he lacked business acumen to so hopeless a degree that in 1806 he died a poor man.

In woods, Sheraton exhibited a pronounced preference for mahogany, pioneered plywood construction, and made a specialty of feathered and fiddle-back veneers. Caring little for carving, he depended for decorative contrast chiefly on inlay in the use of which he showed himself a true genius. Tulip or satinwood between narrow lines of ebony was his favorite combination and, with brass or ivory key plates and drawer pulls, it produced a mellow effect of rare beauty.

In his book, Sheraton was the first designer to give explicit instructions as to finish which, boiled down, consists of the standard French polishing method of that era. He does, however, hint at a stain (then a complete novelty) when he suggests the addition of a little "alkanet root" to the pad in order to impart a somewhat more reddish tone to the finish.

Today, however, stain is not customarily employed, the reproduction of the characteristic mellow orange hue being brought about by red mahogany filler over a wash coat of shellac, or a mist coat of equal parts lacquer and reducer. Should gum or birch parts be encountered, it is necessary to mix a special stain consisting of aniline red, brown, yellow and black powders mixed in

proportions suited to the nature of the wood, and dissolved in hot water. Sheraton is also turned out in brown mahogany in which case Adam Brown water stain will serve. Two-tone effects are obtainable by staining and filling the dark parts and filling only on the lighter ones.



Typical Sheraton, showing effective use of figured veneers and inlay.

As a final finish white shellac may be applied, sanded smooth and followed by two coats pale rubbing and polishing varnish, or three coats heavy-body wood lacquer, either rubbed dull with pumice stone and oil or polished to a high gloss with rotten-stone and water. Where the piece is all or part satinwood, stain with ¾-oz. brown aniline and ¼-oz. lemon yellow tartarzine to a gallon of hot water, followed by a second coat if used as inlay or overlay on walnut to tone with it.

Inlay is not stained or filled unless it is birch or maple, in which case it is stained black with nigrosene water stain to imitate ebony. An extremely pale varnish is required over rosewood, vermilion wood, tulip and satin wood but, since even the best are likely to yellow in time, lacquer is to be preferred to bring out and preserve the full beauty of these tropical woods.

Millwork Finishing.

The time has come when manufacturers of high-grade doors and interior trim, such as is ordered for fine hotels, etc., must send their woodwork out finished either partially or entirely, with stain, filler, shellac and varnish, lacquer, enamel or wax. However, finishing operations in such establishment are not as steady as other factory production. Sometimes a millwork concern needs 20 or 30 finishers for several weeks; then for a while there isn't enough work to keep one finisher going.

One concern has met these conditions by providing suitable space and facilities for finishing, and then letting out the work on contract to a foreman finisher who is given some extra inducement to be always in readiness on reasonable notice. The foreman finisher hires his own crew and is responsible for the quality and speed of the work. The woodworking concern today that is prepared to do finishing gets many jobs which otherwise would be booked elsewhere.

Farewell Dinner

On the evening of September 8, at the Waldorf, the Industrial Chemical Co., New York, gave a farewell dinner to its fellow associate, Mr. Isaac Buenaflor, who was scheduled to sail later in the week for the Philippine Islands. Mr. J. Wrench, treasurer, acted as toastmaster of the evening.

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Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Glued-up Ash.

What is the proper way to finish glued-up ash doors where the glue joints are exposed? This ash will be used on the outside where it will be exposed to the weather, and what we wish to do is to finish it in a light brown without using varnish, and at the same time have it weather proof so that rain and cold weather will not affect the glue joints.—P. G. M.

Step Ladder Stool Finish.

We are experiencing some difficulties in obtaining a suitable finish for use on our step ladder stools. We have arrived at the desired color by mixing one pound of raw sienna ground in japan, with one gallon of floor varnish. This gives us a light oak finish, or just the color we want to use on these step ladder stools.

The wood is white wood, or spruce, and we want to get this color and finish with one coat, by dipping. Of course, floor varnish is quite expensive and what we are after is to get something that will give us the same finish at less cost.

We will greatly appreciate any suggestions you can offer on the above, in the way of materials that could be used for this purpose.—L. L. Corp.

You can secure coach varnishes for as little as 80 cents per gallon in barrels. These will not, of course, compete in durability with the higher-priced, longer-oil floor varnishes, but they will give a cheaper finish. Perhaps you might be able to secure a ready-made color varnish at from $1.00 to $1.25 a gallon, which would save the labor expense of mixing as well.—I. F.

Washing Machine Finish.

Our washing machine has a wooden lid and frame around it, and as the seasons vary between hot and cold, and due also to varying conditions under which the washer has to work, there is shrink and bulge between the lid and the frame to cause us some trouble. Do you know of any varnish or finishing material we could use to reduce this swelling and shrinking? One old painter told us that linseed oil in three parts and turpentine in one part would at least help. The wood we use is entirely cypress. Any suggestions you can make will be very thankfully received.—The K. K. Washer Co.

With reference to your inquiry for a material to lessen the change in size and shape of the wooden lid and frame on washing machines, would say that at best this is a rather difficult problem. No matter how carefully the wood may be protected it is almost certain to absorb some moisture during wet conditions, and give it off again as soon as conditions change.

The problem is made still more difficult by the fact that the lid

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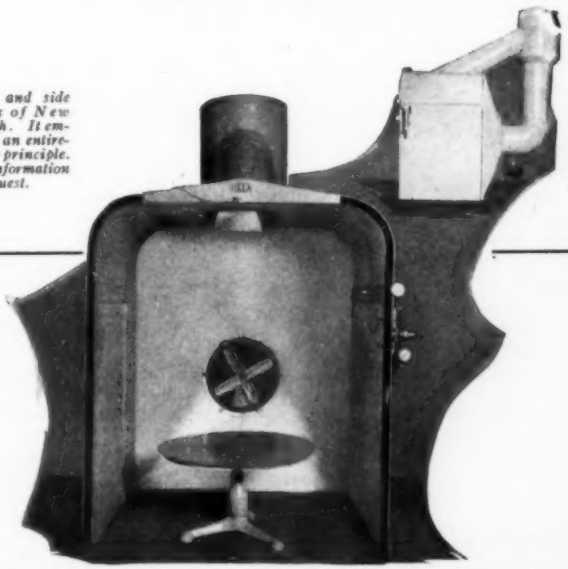

and the rim around it represent two wooden circular pieces which, as they absorb moisture, expand in opposite directions, the rim becoming smaller in internal circumference while the lid becomes larger. This makes the lid bind in the rim almost twice as quickly as would be the case if one of these parts were made of metal instead of both being made of wood.

While it is true that dipping these wooden parts in a mixture of linseed oil and turpentine will help some in preventing this trouble, it will not be entirely successful because the linseed oil film is somewhat coarse and easily allows water and moisture to penetrate.

China wood oil is somewhat better in this moisture-proof respect and no doubt the best procedure would be to dip the wooden parts in one or two coats of a rather thin varnish containing a large amount of china wood oil, such as many of the agricultural-implement coach varnishes or the exterior spar varnishes used in architectural work. The varnish should be quite thin, however, when it is applied so as to aid in penetrating into the pores of the wood rather than remaining entirely on the outer surface.

Of course a clear nitro-cellulose lacquer would be an ideal material for preventing the absorption of water were it not for the fact that when the film of lacquer becomes broken through an accident such as scarring or scratching and the water or moisture has a chance to get behind it, it shows a decided tendency to lose its adhesion for the wood and consequently begins to chip off.

So long as the film of nitro-cellulose lacquer remains entirely unbroken it is practically waterproof, but of course on a washing machine top the chances are that the film will be broken within a comparatively short time and then the protection would not be as great as if the top had been dipped in a long-oil spar varnish or a long-oil agricultural coach varnish, which had penetrated into the wood instead of merely laying on top as would be the case with a nitro-cellulose lacquer.

Any reputable varnish manufacturer can furnish you with a suitable thin-boiled varnish long in China wood oil content.—I. F.

Stains For "Aged" Effects.

In July number J. C. asks for formulas for stains for making old effects on walnut, mahogany and oak, also on maple and birch. I suppose what he wants on maple and birch is something along the line of a weathered effect.

A weathered effect can be produced on maple, birch and oak by reducing dropblack with turpentine, then applying a coat of it to the wood and wiping off before it becomes set. A grayish, weathered effect can also be given these woods by dissolving either water-soluble or spirit-soluble nigrosine in its proper solvent and reducing to the desired shade. A better gray for birch and maple can be made by dissolving in two gallons of water the following: sulphate of soda, 4 ozs.; sulphate of iron, 1 oz.; nigrosine, 1 dram; orange Y, 5 grains. Apply to the wood and allow to stand until the following day, as this time is necessary for the stain to complete its work. A darker and richer gray can be made by first giving the wood a coat of tannic acid, using

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one ounce of acid to a gallon of water and allowing it to dry before applying the stain. Various shades of gray can be made by varying the strength of the two solutions.

Old shades of mahogany and walnut can be made by dissolving 1 oz. of bichromate of potash in ½ gal. of water. The depth of color can be deepened by first giving the wood a coat of tannic acid as recommended in the foregoing paragraph.

What is known as Cathedral Oak is a color that matches the color of the old oak beams of the cathedrals of England and Europe, and which have gradually darkened throughout the centuries. To make this finish dissolve 2 ozs. of carbonate of potash in a gallon of water and coat the wood with this solution. When dry, sandpaper carefully to remove all raised grain. Then apply a coat of the following: bichromate of potash, 1 dram; black P. B., ¼ oz.; naphthol scarlet, 15 grains; walnut crystals, 2 ozs.; water, 3 quarts.

When the stain is dry, smooth off well by rubbing with curled hair or upholsterer's moss, then apply a coat of the following: linseed oil, ½ pint; asphaltum varnish, ¼ pint; naphtha, 1 qt. Before this latter coat becomes dry clean off with rags. Allow this to stand until the following day, then shellac and wax, or put only a couple coats of banana oil and wax.—C. P. Connor.

In view of the fact that all brands of aniline stains are not exactly alike in composition, it would be difficult to give set formulas for producing the effects requested by J. C. in July issue.

Practically all "old mahogany" is in a brown shade, a stain for which can be made up with about 4 oz. of powder to the gallon of hot water. For "walnut" you can use 5 to 6 oz. of walnut crystals to the gallon of hot water, or 4 oz. of walnut aniline dry stain.

There are so many different shades of "old oak," ranging from greenish black to dark brown that we suggest you simply purchase a number of red, brown, yellow and black aniline powders and make various mixtures until the desired effects are secured.

Very much the same applies to antique maple, which may be made up with anilines approximately as follows: 9 parts "lemon yellow," 1 part "tobacco brown," a trace of blue-black ebony and a very small trace of ruby.

Probably the simplest method of procuring any stain effect is to write to the manufacturers advertising in these pages and request panels, indicating the woods in which you are interested. They have all of these effects carefully worked out and can show you the complete finish. You can then secure the stains by number and thus avoid the necessity for experimenting.—I. F.

For Maple and Mahogany.

Kindly give us the best formula to finish maple and mahogany.—N. E. Cabt. Co.

This is a rather broad question as you do not state exactly what effects are desired. That is, gray, amber or brown maple, red, natural or brown mahogany.

The best method is to secure a number of staple basic water soluble aniline powders such as red, brown, yellow and black. By intermixing these in varying pro-

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portions you can secure practically any desired color effect, the tone varying with the predominant powder, and the depth of shade with the amount used to the gallon of hot water. In the case of the maple, shellac and varnish or lacquer; on mahogany sand down the raised grain, apply a wash coat of shellac, fill with red or brown filler, shellac and varnish or lacquer—rubbing the final finish dull or polishing as desired.—I. F.

Making Gum Look Like Walnut or Mahogany.

In answer to A. F. Co.'s inquiry in July issue, the choice lies between using water stain with the attendant sanding expense, and applying a wash coat of pure shellac (about a pound to the gallon of alcohol) to the bare wood. An oil stain may be applied over this, and a fairly uniform coloring may be obtained.

In either case an extra operation is necessary, but as the shellac dries very quickly, and very little of it is required, it is probable that this method will work out cheaper. If you care to send unfinished panels to the stain manufacturers advertising in these pages, we feel sure they will be glad to work out the problem for you and show you just what the results will be.—I. F.

In July issue, A. F. Co. asks for the "best and cheapest method of imitating walnut and mahogany over log-run gum." When one wants a good job the best is always the cheapest, but the cheapest is not always the best. These two words are used so freely at times that in the present instance I am at a loss to know exactly what A. F. Co. want, but will give them some methods which I think will meet their requirements.

For Making Walnut

Log-run gum is almost certain to contain a quantity of white wood that will require touching up. For this touching-up stain dissolve two ozs. of walnut crystals in a quart of hot water, and when cold, apply to the white wood with a camel hair brush. Have brushes of different sizes to suit the streaks of different widths. If the foregoing proportions make the stain too dark for the purpose reduce with water; if the stain is too light add more walnut crystals. One cannot be certain of this stain until it has been tried out with the second coat of stain. Allow this water stain to dry, then sandpaper with fine paper to remove any fuzz that may be raised—but sandpaper lightly.

For the main coat of stain mix together equal parts of asphaltum varnish and a good grade of furniture varnish, and reduce with pure turpentine to the desired depth of color. I have made this stain with linseed oil in place of the varnish, but the oil dries too slowly for the average shop, hence the reason for adopting the use of varnish. The asphaltum-varnish stain will dry well over night for the ordinary varnish finish. But if a lacquer finish is to be applied it had better stand from 24 to 48 hours. If ordinary varnish finish is to be used, apply a thin coat of shellac over the stain, sandpaper, then apply the varnish. If a lacquer finish, do not apply any shellac, but rub the stain to a smooth, glass-like finish with steel wool, dust it well and proceed with the lacquer.

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For Making Mahogany

The best mahogany finish is made with a water stain, the second-best with an oil stain. Water stain is more fast to light, but it opens the cells in the wood and requires more material to get a good body of finish.

Oil stain is apt to fade in strong light and does not make as clear a finish as does water stain, but has the advantage of not raising any fuzz. It seals the cells of the wood and helps hold out subsequent finishing coats.

To finish with water stain obtain the powder in the two shades known as Mahogany Brown and Mahogany Red. Mix these in such proportions as will give the desired shade, or submit the shade of color you wish and nave your supply house mix these powders for you. Dissolve the powder in an earthen vessel with water heated to a temperature of approximately 175 deg. F. Pour the water on the powder and stir until fully dissolved. When cool, stain the white streaks in the wood, and when this is dry coat the whole surface. If an ordinary varnish finish is desired, shellac after the stain is dry, sandpaper and varnish. If a lacquer finish omit the shellac, but rub the surface with curled hair or upholsterer's moss to remove the fuzz and give a smooth finish to the wood, then apply the lacquer.

We would not advise the use of lacquer over an oil stain, as only a shellac and varnish finish is suitable. When an oil stain is used the white streaks may be first stained with either water or oil stain, much depending on the kind of oil stain used. After the stain is dry, shellac, sandpaper and varnish in the usual way.—C. P. Connor.

Stain Trouble In Australia.

We introduced the spray method of finish some years ago in our finishing shop along with some well known American finishing products, but have never been able to overcome some of the difficulties which seem to bristle round the subject.

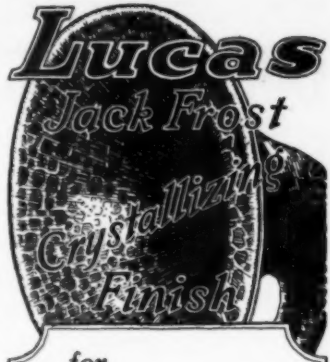
Setting aside the question of cost as compared to the ordinary rubber work with shellac polishes, which has been English practice for many years, we are chiefly in trouble in the matter of oil stains. We find it necessary to use oil stains as against water stains in order to avoid pulling up the grain after sanding. This remark applies particularly to finishes on maple, which may be described as a woolly kind of mahogany. Maple is not its botanical name, but it is known here as such.

This timber is largely used, and we stain it a variety of reds and browns. Oil stains seem uncertain in their action, and sometimes seem to react with the coats of finish and discolor them. Matching earlier work at a later date also presents many difficulties.

Perhaps some system of standardization of stains might overcome this to an extent, but there is always the varying timber specimens to reckon with, which seem to take a given stain differently.

The fact is we have been so long used to the simple chemistry of water stains and shellac, that the complexity of the amyl acetate and nitro-cellulose compounds plus aniline oil stains is a bit over our head.

The polished portions of our samples show the effect we wish to produce. These samples have



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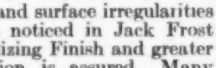

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It is a perfect wood finishing agent, of an advanced type.

It has the appearance of pure cut shellac, without any of shellac's draw-backs. It will not check or crack under varnish with fluctuating weather conditions.

DON-O-LAC
is an excellent builder and sands beautifully.

Of especial interest is the fact that Don-O-Lac mixes perfectly with lacquer in any proportion.

DON-O-LAC COMPANY
Rochester, New York

been done by our usual shellac and water stain methods.

If you can put us in touch with any information which bears on our difficulties, we shall be most grateful.—B. W. & Co., Ltd., Sydney, Australia.

We believe that we, here in this country (U. S. A.) have an immense advantage over you from the fact that we can use in oil stains as a vehicle, better solvents than price permits you to use. If it were possible for you to use benzole, turpentine and other similar products in place of gas oil or creosote oil, it might help, but nevertheless the issue still stands that even aside of the vehicle problem, part of the constituents of some oil soluble colors are likely to be injurious to any finishing material. The fact is that even varnish may succumb to them, but it generally takes a little longer for the injury to manifest itself.

Your problem comes to us in another manner; with the introduction of Philippine mahoganies, we are confronted with the same grain-raising proposition, provided these woods are to be used at a profit.

Thus we have found it necessary to evolve a stain that first will be possible of application to these woods; second, one that will not fade; and third, one that will work under wood lacquers, shellac, or in fact any finishing materials. We are submitting formulas for a walnut and for a mahogany, and while we realize that you probably cannot recognize the colors, yet they will serve as examples.

Now as to the principle involved, the use of acid, re-acting, aniline dyes for your color, and

the dried carbonate of soda and shellac to make the soap solution of the shellac. In order to carry out an experiment, do this: Take sufficient quantity of any mixture of dyes, water soluble and dissolve them in one half the quantity of water that you would use in order to produce the correct shade. In the other half of the water dissolve the soda and the shellac. This may take 48 hours; warm water and shaking would help. Now mix the two solutions.

Claremont Mahogany Stain for Birch or Maple.

Formula:

Orange A. D.	200 grains
Nigrosine	95 "
Scarlet 2 R. B.	15 "
Potassium Bichromate	25 "
White Shellac Gum	480 "
Dried Carbonate of Soda	60 "
Water	14-oz.

Directions:

Dissolve the stain powders in 7-oz. of water. In the other 7-oz. of water dissolve the shellac gum, and the carbonate of soda. It is necessary that the carbonate of soda is the dried powder. Warm the water; it usually requires 48 hours to complete the solution. When all dissolved, mix the two solutions, let stand overnight and skim off the small amount of wax which rises in the form of a white scum.

The stain will spray or brush and it can be "laid off," "mottled" or "figured" with brush when drying.

Walnut on Birch or Maple.

Walnut crystals, 13-oz.
Jet black nigrosine, 1-oz. and 22 grains.
Bichromate of potash, ½-oz.
Napthol yellow, ½-oz.
Orange, 197 grains.
Water, 4 gallons.
White shellac, 18-oz. (480 grains to the ounce.)
Dried carbonate of soda, 18 drams (60 grains to the dram.)

You will find that it does not raise the grain nearly as much, and that you can put wood lacquer right over it, or in fact any

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other finishing material. It can be sprayed or brushed. You can brush it and lay it off or you can apply a heavy coat and make it darker, and you have the satisfaction of knowing that it will not fade. This is being used largely on interior trim. At first, the workmen claim all sorts of difficulties, but it saves a lot of time and, on some woods, filling is absolutely unnecessary.

We cannot give you any other assistance. Our recommendation is to entirely omit oil stains unless it be possible to get the right shade by using asphaltum varnish diluted with turpentine and 25 per cent. naphtha. This is the only color material that we have found safe to use under wood lacquers.—Industrial Laboratories, Inc.

Use of Gold Leaf.

In the June number of this journal, A. L. F. Co. asks for information on the use of gold leaf on iron and white metal. If I knew the purpose to which the work is to be put I would be in a better position to give the desired information. However, I will give the fundamentals, leaving A. L. F. Co. to work out the details to suit its own peculiar requirements.

To do permanent work, the metal to be covered must be free from all acid and grease, and thoroughly clean in every respect. Gold leaf is attached to metal by means of a size especially prepared for the purpose. This size can be bought from dealers in finishing materials, or made from boiled linseed oil.

To make a size from linseed oil, expose the oil to the air until it becomes fat. Fill a bottle or can with the oil, and leave it uncovered until the oil becomes thick. This is known as "fat" oil.

With this oil, apply a uniformly-thin coat on the surface to be covered with gold leaf. If it is some design that is to be covered, the design should be first marked out. Apply the oil with a fine brush, taking care to have the outline perfectly true. When the oil becomes tacky it is ready to receive the gold leaf.

The gold leaf can be applied either with a flat camel-hair brush or a piece of wax paper. If a brush is used the method of procedure is as follows: Take the brush in one hand and brush it rapidly over the palm of the other hand. The purpose of this is to "magnetize" the hair so that it will pick up the gold leaf.

When the hair is magnetized, touch it to the edge of a piece of gold leaf, and gently carry the latter to the place where it is to be laid. When it is laid on the size, press it down gently with a soft cloth pad or cotton batting. After the size has had time to harden the surplus margin of gold leaf should be carefully wiped away.

One thing to be remembered is that the gold leaf will stick where there is any size, and nowhere else. The shape of the gold leaf, after the surplus has been cleaned away, will be exactly that of the surface covered with the size.—C. B. A.

Using Varnish Remover.

Like Mr. J. K. Cooper, whose article appeared some time ago in this journal, I find it difficult to teach people to let the remover do its work before beginning to clean it off. If scraping is begun before the remover has eaten

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through the old materials, the result is never clean.

The following, I find, is the best method of stripping a job: Lay out as many pieces as can be conveniently handled. Apply remover freely on the first piece, cover with paper and saturate the paper. Do likewise to the next piece and so on until all pieces are so treated. See that all are kept thoroughly wet with remover. Lift a corner of the paper occasionally to see whether the old varnish will come clean away from the wood; when this condition has been reached it should be possible to wipe the piece perfectly clean.

If this method is applied faithfully the work can be done in half the time and with half the material that would be required by the ordinary method.

I do not agree that it is acetone or benzole which causes the trouble when a job has been cleaned off and is lacquered. In my opinion (and this is based on experience) it is the paraffin wax, contained in the remover, that causes soft swollen patches. If the manufacturers of removers would use bone meal, as was used in the original German removers, in place of paraffin wax, I feel sure that trouble would not occur. —H. R. Walters, Sydney, N. S. W., Australia.

Shellac Over Varnish.

Referring to an article in June issue under the above heading, it may be of interest to readers to know that this type of finish is used extensively in England and Germany for pianos and other high-grade work. The firm in which I am employed, in Sydney, N. S. W., used it exclusively on pianos for about ten years. I believe the method was originated by a firm of varnish makers named Oesten & Co. in Berlin, Germany. Many varnish makers in England copied the varnish which is of a special kind suited to the peculiar process.

The method we followed was to fill with a paste wood filler, ground-work with shellac solution to seal all pores, apply one heavy coat of special oil varnish, and finish in the usual way of French polishing with shellac solution.

The varnish was so prepared that it combined with the alcoholic solution of shellac. We used a paraffin oil as lubricant for the rubber.

Until the advent of oil varnish as a finishing material, raw linseed oil was used as a lubricant, but as it would have had solvent action on the resins in the varnish, we used paraffin oil for that purpose.

I have seen some awful results where an unsuitable varnish was used. For that reason I was surprised to read in a recent issue, instructions for mending damaged places on a varnish-finished surface, with shellac polish. I would say that a part so treated would crack every time. I am now working in pyroxlyn finishes which have none of the old troubles.—H. R. W.

Simplified practice consists of eliminating excess or unnecessary varieties, types, sizes or brands of commodities.

Hackathorn With Boston Varnish.

The many friends of C. F. Hackathorn will be pleased to learn that he has recently become associated with the Boston Varnish Co., Boston, Mass.

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High Lustre Auto Lacquer.*

An important feature to expect in high lustre lacquers is that the gloss of the unpolished surfaces shall correspond to the gloss on the rubbed and polished areas. But you may ask what it profits one to use a high lustre lacquer if it is necessary to rub the glossy top surface down in order to do away with unsightly orange peel.

We know that whenever the spray is handled by unskilled or semi-skilled workmen, pebble or orange peel will be evident to a greater or less extent. The high lustre lacquer will cause such roughness to show up much more markedly, than would a dull lacquer with the same amount of pebble. If the polished and unpolished areas correspond in gloss, it will not be necessary to rub down the entire car, but only the prominent portions where a smooth surface is imperative.

No lacquer can be satisfactory for high gloss finishing unless it be fairly easy polishing. If the film is either too hard, too soft, or too tough, it will be impossible for the rubbers to show a good job. A system which includes water sanding of the lacquer coat immediately before the final, and the subsequent spraying on a 70-30 or 80-20 coat to flow out and fill in the sand scratches, is to be recommended as good practice, seems to pay for itself in the time saved by the polishers.

The film produced by the high lustre lacquer must not show pinholes or pores, for these are pulled out by the rubbing abrasive to give a haze which does not make for lustre.

If the polishing compound is too coarse in nature and not adapted to the lacquer in hand, it will cause innumerable parallel scratches which diffract light and thus produce the hazy surface appearance. One or two colors require much more polishing for the complete elimination of this haze. The worst offender seems to be dark blue.

To summarize briefly, we see that it is not sufficient for a high lustre lacquer to possess good gloss. The personal equation of the spraying operation makes it necessary for certain portions of a body to be rubbed and polished for elimination of orange peel roughness. Because of this, the lacquer must rub and polish easily to a gloss which matches that of the unrubbed sections.

*From address of E. G. Richardson, chief chemist, Berry Bros., Inc., delivered at Fifth Annual Convention of Auto. Body Bldr's. Asso., at Detroit.

"Spackling."

During the last few months a controversy has arisen in the trade papers on the origin of the word "Spackling" and the method of its procedure.

It appears to me that the term is being misused, as it should be spelled "Spachtling" which is originally German. "Spachtel" (derived from "Spatula") means a broad-bladed knife made from metal or wood. It is identical with our well-known broad knife used by painters and paperhangers.

The material employed for the purpose is called "kitt", the English translations of which are "cement", "putty", and "filler". The application of this material is termed "Spachteling" or "Spachtling".

After the surfaces had been primed and had been allowed to dry sufficiently, a putty mixture was applied with the broad knife to fill all the voids, and when the

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putty dried it was rubbed down in various ways according to the material used or the results desired.

The main ingredients of the mixture used for the purpose of painting and varnishing carriages and other varnish-finished bodies, were dry white lead, whiting, plaster of paris, dry black or other coloring matter. For enameling the coloring matter was omitted. In both cases dry white zinc was used instead of white lead.

The liquid used for the purpose varied. For interior work a high grade hidestock blue was used, whereas oils, varnishes and driers were used for exterior work. Every painter had his own ideas about the proper ingredients of the dry materials and as to the liquids or binders; therefore, no established formula was in vogue.

Similar processes were used in Central Europe by people of other nationalities and the word was slightly changed according to their respective languages. However, it seems that the German expression has dominated as the same term is most frequently used today.

The present term for the material used for the same purpose is "rough stuff" and it is now produced ready for application by a number of manufacturers under more or less uniform formulas.—Geo. Whigelt.

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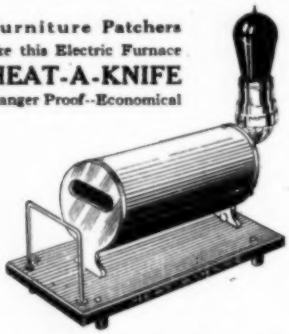

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$2.00 extra for red light current heat indicator attached. F. O. B. Chicago.

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